

emission wavelengths and it is envisaged that up to 5 different analytes could be measured within one channel. In addition to the immunoassay measurements, electrochemical measurements could also be incorporated into the strip measurement. For example, an electrochemical measurement of glucose concentration and a glycosylated haemoglobin measurement could be performed using the present platform. For example, in the case of an electrochemical glucose measurement, an additional set of electrodes would be incorporated mirroring the position of the hematocrit electrodes in the other channel. All the necessary reagents would be deposited on the electrodes. As the blood fills the channels and all the previously described immunoassay events occur, the electrochemical measurement of the blood glucose occurs, the reader interprets the glucose concentration and the blood is washed out into the sink. The present platform will therefore be able to incorporate a very diverse range of measurements upon one cartridge.

**[0140]** Many of the current POC immunoassays platforms require refrigerated storage of the strips. The present invention may avoid such problems by employing features that make room temperature stability possible to obtain. For example other POC immunoassay systems have buffer pouches that contain an enzymatic substrate (a wet reagent), these substrates have limited room temperature stability, and as a result the product has a refrigerated stability profile. In comparison the only "wet" reagent of the present invention is the buffer reservoir/reservoirs cartridge. This is not contained within the sample cartridge and as buffer does not generally go off at room temperature, the present invention avoids this problem. Likewise none of the reagents are wet reagents, as they will all be deposited in the cartridge and resuspended by the buffer when delivered to the sample channel or resuspended by the blood. Deposited dry reagents will thus avoid any wet reagent instability; likewise enzyme labels (i.e. enzyme-antibody labels) have been avoided (due to their poor stability profiles) and stabilisation formulations can be optimised for a single reagent (e.g. magnetic particle) without impacting the stability profile of other reagents (e.g. the label).

## EXPERIMENTAL SECTION

### Materials:

**[0141]** Maleimide-PEG2-biotin:

**[0142]** Thermo Scientific, Cat 21901 (EZ-link maleimide-PEG2-biotin).

### Fluorescent Amine Latex Particles:

**[0143]** Invitrogen, Cat F8765 (1  $\mu$ m yellow-green fluospheres with amine surface functionalisation)

### Fluorescent Neutravidin Latex Particles:

**[0144]** Invitrogen, Cat F8776 (1  $\mu$ m yellow-green fluospheres with neutravidin surface functionalisation)

### Paramagnetic Particles:

**[0145]** Ademtech, Cat 03223 (200 nm Strep+ paramagnetic particles)

### Antibody 1H12:

**[0146]** Hytest, Cat 4P33 MAb 1H12 (Anti-PSA, human)

### Antibody 5A6:

**[0147]** Hytest, Cat 4P33 MAb 5A6 (Anti-PSA, human)

### PBS:

**[0148]** Thermo Scientific, Cat 28372 (BupH phosphate buffered saline packs)

### BSA:

**[0149]** Sigma, Cat A4503-50G (Albumin, from bovine serum)

### Water:

**[0150]** Sigma, Cat W4502 (water for molecular biology)

### 2MEA:

**[0151]** Thermo Scientific, Cat 20408 (2-mercaptoethanolamine hydrochloride)

### SPDP:

**[0152]** Pierce, Cat 21857 (N -Succinimidyl 3-(2-pyridyldithio)-propionate)

### PSA:

**[0153]** Hytest, Cat 8P78 (prostate specific antigen)

### Biotin Quantification Kit:

**[0154]** Thermo Scientific, Cat 28005 (Pierce biotin quantification kit)

### Size Exclusion Columns:

**[0155]** Thermo Scientific, Cat 89882 (Zeba spin desalting columns)

### Size Exclusion Columns:

**[0156]** GE Healthcare, Cat 17-0851-01 (PD10 columns)

### EDTA:

**[0157]** Sigma, Cat EDS-100G (ethylenediamine tetracetic acid, anhydrous)

### Tween:

**[0158]** Sigma P7949-100ML (Tween-20)

### DMSO:

**[0159]** Thermo Scientific, Cat 20684 (dimethylsulfoxide)

## Reagent Preparation

### Preparation of Paramagnetic Particles and Latex Particles Using Streptavidin-Biotin and Neutravidin-Biotin Interactions Respectively

### Antibody

**[0160]** Antibody Disulphide Bond Reduction for Biotinylation

**[0161]** Use undiluted antibody (1H12 and 5A6) stock at a concentration between 2 and 7 mg/ml. An appropriate volume of antibody stock is removed to give 1 mg antibody. An